
Investigate In-Mask Temperature As A Surrogate Indicator Of Potentially "Therapeutic" Nasopharyngeal Temperature Denoting Masks' Therapeutic Efficiency To Complement Masks' Filtration Efficiency Against SARS-CoV-2 And Its Variants

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My opinion

Abundance of information leading to abundance of interpretation leads to abundance of misunderstanding thus creating a double jeopardy preventing the true understanding of information. Herein, I am sharing my interpretation hoping to correct the misunderstanding unless my understanding of the ever-changing situation may eventually be misunderstood considering the double jeopardy of too many informing harmlessly and too many interpreting harmlessly while harmful misunderstanding still persisting amidst the soaring pandemic.

When the world wonders about deaths after COVID-19 vaccinations [1], the world forgets that, in Vaccine Adverse Event Reporting System (VAERS) since 1990 [2], Centers for Disease Control and Prevention (CDC) receive reports of deaths presumed to be after any vaccination and these reports number in thousands although it is NOT clear how rarely the suspected vaccines are actually confirmed to be the actual cause of those deaths after thorough investigations by public health officials. The reassuring fact is that compared to millions vaccinated with billions of all vaccine doses over the last three decades as tracked by CDC/VAERS, the COVID-19 vaccinations are happening at the rates of millions being vaccinated per day with target to vaccinate billions in months ahead. Therefore, the reports of presumed deaths after COVID-19 vaccinations may NOT turn out to be an absolute zero especially when the COVID-19 data from across the world is getting updated in real-time globally under the public eye of masses and media who are seeking reassurances to overcome vaccine hesitancy. Moreover, the mitigation of pandemic further starts appearing harder when reports of new SARS-CoV-2 variants surface with proven data for high transmissibility and/or high virulence to raise the concerns about evolving resistance of SARS-CoV-2

variants to currently approved vaccines warranting the need to adjust the newly invented COVID-19 vaccines [3-4]. Although too many moving pieces of real-time scientific information make the global population dizzy amidst the pandemic, some harmless theories go unnoticed and turn harmfully stale [5-7].

Hereafter, unless SARS-CoV-2 learns to evolve into a variant that does NOT like to reside and proliferate in cold secluded vestiges of human nasopharyngeal areas [8-12], it may be high time that we explore the consistent therapeutic efficiency of masks rather than focusing on their variable filtering efficiency considering that we may be able to use in-mask temperatures as surrogate indicators for nasopharyngeal temperatures which can be easily proven by concurrently and continuously measuring in-mask temperatures and nasopharyngeal temperatures among volunteers wearing various types of masks for varied durations of times. Alternatively, if planning a volunteer study seems too arduous amidst the pandemic, the nasopharyngeal swabs' tissue samples' temperatures can be measured by infra-red no-touch thermometer or thermal imaging camera at the time of testing for SARS-CoV-2 among asymptomatic population to gauge if the nasopharyngeal swabs' tissue samples' temperatures of those testing positive for SARS-CoV-2 turn out to be in vivo lower than nasopharyngeal swabs' tissue samples' temperatures of those testing negative for SARS-CoV-2 considering that in vitro temperature affecting SARS-CoV-2 testing has been demonstrated [13-15]. It may be ironic that the utility of masks discovered during pandemic may remain relevant even after the pandemic is over when filtration-cum-therapeutic efficiency of masks may continue to decrease surgical site infections among perioperative patients, hospital acquired infections among hospitalized patients and acute exacerbations among chronic obstructive pulmonary disease patients as long as patients, caregivers and healthcare

providers continue to appropriately and religiously wear masks even after the pandemic is over [16-21].

Essentially, it has been long overdue to recognize the pathophysiological importance of our nosy noses [22-24], unless we need evidence from neck-only breathers to scientifically and experimentally prove to us all the things they and their noses miss due to the absence of rhythmic airflow happening across their noses when rhythmic breathing is happening only and only across their tracheal stomas in their necks [25-28]. Ironically, the long-term changes in the functioning of noses among neck-only breathers may potentially make them more tolerant to masks covering their mouths and noses considering that such masks may potentially neither induce increased in-mask temperatures nor induce increased nasopharyngeal temperatures among them when they have become used to absent rhythmic-coolant-airflow across their non-breathing noses. Interestingly, the investigation of concurrently and continuously measuring in-mask temperatures and nasopharyngeal temperatures among neck-only breather-subgroup of volunteers wearing various types of masks covering their mouths and noses for varied durations of times along with or without neck-masks covering their tracheal stomas may confirm or refute the consequences on local tissue temperatures within the noses of neck-only breathers with implications therein for nasopharyngeal swabsâ€™ tissue samplesâ€™ temperatures among neck-only breathers.

Reference(s)

1. Torjesen I. Covid-19: Norway investigates 23 deaths in frail elderly patients after vaccination. *BMJ*. 2021;372:n149. Published 2021 Jan 15. <https://doi.org/10.1136/bmj.n149>
2. Centers for Disease Control and Prevention. CDC WONDER: About The Vaccine Adverse Event Reporting System (VAERS). <https://wonder.cdc.gov/vaers.html>
3. Association of American Medical Colleges. The COVID-19 variants are spreading rapidly. Hereâ€™s what scientists know about them â€” and why you need a better mask. <https://www.aamc.org/news-insights/covid-19-variants-are-spreading-rapidly-here-s-what-scientists-know-about-them-and-why-you-need>
4. Kupferschmidt K. New mutations raise specter of 'immune escape'. *Science*. 2021;371(6527):329-330. <https://doi.org/10.1126/science.371.6527.329>
5. Gupta D. Does mask use affect the quantitative severe acute respiratory syndrome coronavirus 2 load in the nasopharynx?. *J Pediatr*. 2021;228:314. <https://doi.org/10.1016/j.jpeds.2020.09.050>
6. Gupta D. Living with in-mask micro-climate. *Med Hypotheses*. 2020;144:110010. <https://doi.org/10.1016/j.mehy.2020.110010>
7. Gupta D. "Therapeutic" facemasks. *Med Hypotheses*. 2020;143:109855. <https://doi.org/10.1016/j.mehy.2020.109855>
8. Morris DH, Yinda KC, Gamble A, et al. Mechanistic theory predicts the effects of temperature and humidity on inactivation of SARS-CoV-2 and other enveloped viruses. Preprint. *bioRxiv*. 2020;2020.10.16.341883. Published 2020 Oct 16. <https://doi.org/10.1101/2020.10.16.341883>
9. Vâ€™kovski P, Gultom M, Kelly J, et al. Disparate temperature-dependent virus â€” host dynamics for SARS-CoV-2 and SARS-CoV in the human respiratory epithelium. Preprint. *bioRxiv*. 2020;2020.04.27.062315. Published 2020 Apr 27. <https://doi.org/10.1101/2020.04.27.062315>
10. Foxman EF, Storer JA, Fitzgerald ME, et al. Temperature-dependent innate defense against the common cold virus limits viral replication at warm temperature in mouse airway cells. *Proc Natl Acad Sci U S A*. 2015;112(3):827-832. <https://doi.org/10.1073/pnas.1411030112>
11. Matson MJ, Yinda CK, Seifert SN, et al. Effect of Environmental Conditions on SARS-CoV-2 Stability in Human Nasal Mucus and Sputum. *Emerg Infect Dis*. 2020;26(9):2276-2278. <https://doi.org/10.3201/eid2609.202267>
12. Gallo O, Locatello LG, Mazzoni A, Novelli L, Annunziato F. The central role of the nasal microenvironment in the transmission, modulation, and clinical progression of SARS-CoV-2 infection [published online ahead of print, 2020 Nov 26]. *Mucosal Immunol*. 2020;1-12. <https://doi.org/10.1038/s41385-020-00359-2>
13. Basso D, Aita A, Navaglia F, et al. SARS-CoV-2 RNA identification in nasopharyngeal swabs: issues in pre-analytics. *Clin Chem Lab Med*. 2020;58(9):1579-1586. Published 2020 Jun 22. <https://doi.org/10.1515/cclm-2020-0749>
14. Pryce TM, Boan PA, Kay ID, Flexman JP. Thermal treatment of nasopharyngeal samples before cobas SARS-CoV-2 testing. *Clin Microbiol Infect*. 2021;27(1):149-150. <https://doi.org/10.1016/j.cmi.2020.07.042>
15. Skalina KA, Goldstein DY, Sulail J, et al. Extended storage of SARS-CoV-2 nasopharyngeal swabs does not negatively impact results of molecular-based testing across three clinical platforms [published online ahead of print, 2020 Nov 3]. *J Clin Pathol*. 2020;jclinpath-2020-206738. <https://doi.org/10.1136/jclinpath-2020-206738>
16. Losurdo P, Paiano L, Samardzic N, et al. Impact of lockdown for SARS-CoV-2 (COVID-19) on surgical site infection rates: a monocentric observational cohort study. *Updates Surg*. 2020;72(4):1263-1271. <https://doi.org/10.1007/s13304-020-00884-6>
17. Cerulli Irelli E, Morano A, Di Bonaventura C. Reduction in nosocomial infections during the COVID-19 era: a lesson to be learned [published online ahead of print, 2020 Nov 19]. *Updates Surg*. 2020;1-2. <https://doi.org/10.1007/s13304-020-00925-0>

18. McAuley H, Hadley K, Elneima O, et al. COPD in the time of COVID-19: An analysis of acute exacerbations and reported behavioural changes in patients with COPD. *ERJ Open Research*. 2020;00718-2020.
<https://doi.org/10.1183/23120541.00718-2020>
19. Chan KPF, Ma TF, Kwok WC, et al. Significant reduction in hospital admissions for acute exacerbation of chronic obstructive pulmonary disease in Hong Kong during coronavirus disease 2019 pandemic. *Respir Med*. 2020;171:106085.
<https://doi.org/10.1016/j.rmed.2020.106085>
20. Baeza-Martínez C, Zamora-Molina L, Olea-Soto J, Soler-Sempere MJ, García-Pachón E. Reduction in Hospital Admissions for COPD Exacerbation During the Covid-19 Pandemic [Reducción de los ingresos hospitalarios por exacerbación de la EPOC durante la pandemia de la covid-19]. *Open Respiratory Archives*. 2020;2(3):201-202.
<https://doi.org/10.1016/j.opresp.2020.06.003>
21. Tan JY, Conceicao EP, Wee LE, Sim XYJ, Venkatachalam I. COVID-19 public health measures: a reduction in hospital admissions for COPD exacerbations [published online ahead of print, 2020 Dec 3]. *Thorax*. 2020;thoraxjnl-2020-216083.
<https://doi.org/10.1136/thoraxjnl-2020-216083>
22. Lindemann J, Leiacker R, Rettinger G, Keck T. Nasal mucosal temperature during respiration. *Clin Otolaryngol Allied Sci*. 2002;27(3):135-139.
<https://doi.org/10.1046/j.1365-2273.2002.00544.x>
23. McFadden ER Jr, Pichurko BM, Bowman HF, et al. Thermal mapping of the airways in humans. *J Appl Physiol* (1985). 1985;58(2):564-570.
<https://doi.org/10.1152/jappl.1985.58.2.564>
24. Gupta D. Transnasal cooling: a Pandora's box of transnasal patho-physiology. *Med Hypotheses*. 2011;77(2):275-277.
<https://doi.org/10.1016/j.mehy.2011.04.034>
25. Moore-Gillon V. The nose after laryngectomy. *J R Soc Med*. 1985;78(6):435-439.
<https://doi.org/10.1177/014107688507800603>
26. Karaca CT, Gültekin E, Yelken MK, İdem AA, Kalkan M. Long-term histologic changes in nasal mucosa after total laryngectomy. *Int J Otolaryngol*. 2010;2010:137128.
<https://doi.org/10.1155/2010/137128>
27. Karaoglu D, Kocyigit M, Ortekin SG, Adali MK. Late-term Effects of Surgery on Nasal Functions in Patients who Underwent Total Laryngectomy Surgery. *Int Arch Otorhinolaryngol*. 2017;21(3):270-275.
<https://doi.org/10.1055/s-0036-1597972>
28. Hilgers FJ, van Dam FS, Keyzers S, Koster MN, van As CJ, Muller MJ. Rehabilitation of olfaction after laryngectomy by means of a nasal airflow-inducing maneuver: the "polite yawning" technique. *Arch Otolaryngol Head Neck Surg*. 2000;126(6):726-732.
<https://doi.org/10.1001/archotol.126.6.726>